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**AQUATIC INVERTEBRATES AND HABITAT AT A FIXED
STATION ON THE MISSOURI RIVER,
ROOSEVELT COUNTY, MONTANA**

September 15, 2001

**A report to
the Montana Department of Environmental Quality
Helena, Montana**

**by
Wease Bollman
Rhithron Associates, Inc.
Missoula, Montana
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INTRODUCTION

This report is one of 38 brief interpretive summaries of data assembled as part of a statewide, multi-year study conducted by the Montana Department of Environmental Quality (MT DEQ). Each report discusses information generated from a single benthic invertebrate sample collection and habitat evaluation at a fixed station established on a gauged river or high-order tributary. The present treatise focuses on the aquatic community sampled on the Missouri River near Culbertson, Montana on September 15, 2001. The sample site was located by GPS reading at 48° 07' 21" N, 104° 28' 33" W, lying within the Northwestern Glaciated Plains Ecoregion (Woods et al. 1998). The sample was collected by personnel of MT DEQ. Sampling effort consisted of a one-minute kicknet collection (Bukantis 1998). Habitat parameters were evaluated using the MT DEQ Macroinvertebrate Habitat Assessment Field Form for streams with glide/pool prevalence. Invertebrate samples were processed and animals identified by Rhithron Associates, Inc. Analysis of invertebrate assemblages was accomplished by applying the method recommended by Bukantis (1998) for streams of Montana's Plains ecoregions. The method uses a multimetric battery to evaluate disturbance to biotic integrity. Results from the application of other metric batteries may be found in the Appendix.

RESULTS AND DISCUSSION

Table 1 itemizes the evaluated habitat parameters and shows the assigned scores for each, as well as the integrated score and condition category.

Overall habitat conditions scored marginally at this site on the Missouri River. Field observations relate that the site was "full of sediment and downcut" with "no good riffle or cobbles." The substrate was described as "sediment and fine sand" which accounts for the low scores given to the quality of colonizable substrate and the sediment deposition measure. Extensive channel alteration was noted. Streambanks were judged moderately unstable.

Table 1. Stream and riparian habitat assessment for a fixed station on the Missouri River. September, 2001.

Max. possible score	Parameter	Missouri River near Culbertson
20	Bottom substrate	3
20	Pool substrate char.	7
20	Pool variability	15
20	Channel alteration	8
20	Sediment deposition	6
20	Channel sinuosity	10
20	Channel flow status	15
20	Bank vegetation	8 / 8
20	Bank stability	5 / 5
20	Vegetated zone	7 / 7
200	Total	104
	Percent of maximum CONDITION*	52 MARGINAL

*Condition categories: Optimal (OPT) > 80% of maximum score, Sub-optimal (SUB); 75 - 56%, Marginal (MARG) 49 - 29%; Poor <23%. Adapted from Platkin et al. 1998.

Table 2. Metric values, scores, and bioassessment for a fixed station on the Missouri River. The Montana DEQ bioassessment metric battery recommended for streams of the Plains ecoregions (Bukantis 1998) was used for the evaluation. September 2001.

	Missouri River near Culbertson	
METRICS	METRIC VALUES	METRIC SCORES
Taxa richness	7	0
EPT richness	2	0
Biotic index	8.57	0
% Dominant taxon	51.85	1
% Collectors	88.89	1
% EPT	55.56	3
Shannon diversity	1.98	1
% Scrapers and Shredders	3.70	1
Predator taxa	1	0
% Multivoltine	27.78	3
	TOTAL SCORE (max.=30)	10
	PERCENT OF MAX.	33
	Impairment classification	MODERATE
	USE SUPPORT	PARTIAL

Bioassessment results are given in Table 2. When this bioassessment method is applied to these data, scores indicate that this site on the Missouri River is moderately impaired and only partially supports designated uses. However, very low abundance of organisms in the sample (only 27 animals were collected) complicates the evaluation; conclusions and interpretation of results are tenuous. Whether the inadequacy of the sample was due to a depauperate community at the site or to sampling bias is not clear from the data itself, but the habitat evaluation suggests that the former explanation may in fact be the correct one.

The burrowing mayfly *Ametropus* sp. was the most abundant animal collected at the site, confirming that the substrate was composed of soft, sandy deposits. *Cricotopus bicinctus* prefers these environs as well.

CONCLUSIONS

- Low abundance of organisms in the sample prohibits assessment of the site based on invertebrate assemblages; however, severe impairment due to sediment deposition likely accounts for the depauperate sample.

LITERATURE CITED

Bukantis, R. 1998. Rapid bioassessment macroinvertebrate protocols: Sampling and sample analysis SOP's. Working draft. April 22, 1997. Montana Department of Environmental Quality. Planning Prevention and Assistance Division. Helena, Montana.

Woods, A.J., Omernik, J. M. Nesser, J.A., Shelden, J., and Azevedo, S. H. 1999. Ecoregions of Montana. (Color poster with map, descriptive text, summary tables, and photographs) Reston, Virginia. US Geological Survey.

APPENDIX

Taxonomic data and summaries

Missouri River

September 2001

Aquatic Invertebrate Taxonomic Data

Site Name: Missouri River near Culbertson
Site ID: M51MISSR01

Date: 9/15/01
Approx. percent of sample used: 100

Taxon	Quantity	Percent	HBI	FFG
<i>Stylurus</i> sp.	2	7.41	5	PR
Total Odonata	2	7.41		
<i>Ametropus</i> sp.	14	51.85	11	CG
<i>Stenonema</i> sp.	1	3.70	3.5	SC
Total Ephemeroptera	15	55.56		
<i>Cricotopus Bicinctus</i> Gr.	7	25.93	7	CG
<i>Nanocladius</i> sp.	1	3.70	3	CG
<i>Rheotanytarsus</i> sp.	1	3.70	6	CF
<i>Thienemanniella</i> sp.	1	3.70	6	CG
Total Chironomidae	10	37.04		
Grand Total	27	100.00		

Aquatic Invertebrate Summary

Site Name: Missouri River near Culbertson

Date: 9/15/01

Site ID: M51MISSR01

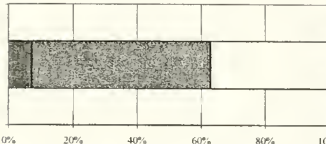
SAMPLE TOTAL	27
EPT abundance	15
TAXA RICHNESS	7
Number EPT taxa	2
Percent EPT	55.56

TAXON	ABUNDANCE	PERCENT
Ametropus	14	51.85
Cricotopus Bicornatus Gr	7	25.93
Stylurus sp	2	7.41
Stenonema sp	1	3.70
Nannocladus sp	1	3.70
SUBTOTAL 5 DOMINANTS	25	92.59
Rheotanytarsus sp	1	3.70
Thienemanniella sp	1	3.70

TAXONOMIC COMPOSITION

GROUP	PERCENT	#TAXA	ABUNDANCE
Misc. Taxa	0.00	0	0
Odonata	7.41	1	2
Ephemeroptera	55.56	2	15
Plecoptera	0.00	0	0
Hemiptera	0.00	0	0
Megaloptera	0.00	0	0
Trichoptera	0.00	0	0
Lepidoptera	0.00	0	0
Coleoptera	0.00	0	0
Diptera	0.00	0	0
Chironomidae	37.04	4	10

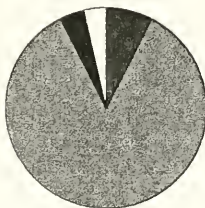
- Misc. Taxa
- Odonata
- Ephemeroptera
- Plecoptera
- Hemiptera
- Megaloptera
- Trichoptera
- Lepidoptera
- Coleoptera
- Diptera
- Chironomidae



FUNCTIONAL COMPOSITION

GROUP	PERCENT	#TAXA	ABUNDANCE
Predator	7.41	1	2
Parasite	0.00	0	0
Gatherer	85.19	4	23
Filterer	3.70	1	1
Herbivore	0.00	0	0
Piercer	0.00	0	0
Scraper	3.70	1	1
Shredder	0.00	0	0
Xylophage	0.00	0	0
Omnivore	0.00	0	0
Unknown	0.00	0	0

- Predator
- Parasite
- Gatherer
- Filterer
- Herbivore
- Piercer
- Scraper
- Shredder
- Xylophage
- Omnivore
- Unknown



TOTAL DOMINANTS	27	100.00
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SAPROBITY

Hilsenhoff Biotic Index	8.57
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DIVERSITY

Shannon H (log _e)	1.37
Shannon H (log ₂)	1.98

Simpson D	#DIV/0!
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VOLITINISM

TYPE	ABUNDANCE	PERCENT
Multivoltine	8	27.78
Univoltine	18	64.81
Semivoltine	2	7.41

TAXA CHARACTERS

#TAXA	ABUNDANCE	PERCENT
Tolerant	1	3.70
Intolerant	0	0.00
Clinger	2	29.63

BIOASSESSMENT INDICES

B-IBI (Karr et al.)

METRIC	VALUE	SCORE
Taxa richness	7	1
E richness	2	1
P richness	0	1
T richness	0	1
Long-lived	0	1
Sensitive richness	0	1
%tolerant	3.70	5
%predators	7.41	1
Clinger richness	2	1
%dominance (3)	85.19	1
TOTAL SCORE		14

28 %

MONTANA DEQ METRICS (Bukantus 1998)

METRIC	VALUE	Plains Ecoregions	Valleys and Foothills	Mountain Ecoregions
Taxa richness	7	0	0	0
EPT richness	2	0	0	0
Biotic Index	8.57	0	0	0
%Dominant taxon	51.85	1	0	0
%Collectors	88.89	1	1	0
%EPT	55.56	3	2	2
Shannon Diversity	1.98	1		
%Scrapers + Shredd	3.70	1	0	0
Predator taxa	1	0		
%Multivoltine	27.78	3		
%H of T	0		3	2
TOTAL SCORES		10	6	2
PERCENT OF MAXIMUM		33.33	25.00	9.52
IMPAIRMENT CLASS		MODERATE	MODERATE	SEVERE

COMMUNITY TOLERANCES

Sediment tolerant taxa	0
Percent sediment tolerant	0.00
Sediment sensitive taxa	0
Percent sediment sensitive	0.00
Metals tolerance index (McGuire)	2.50
Cold stenotherm taxa	0
Percent cold stenotherms	0.00

Montana DEQ metric batteries

